In the Claims:

1-102. (Cancelled)

103. (Withdrawn) Apparatus for treatment of a feed water stream, said feed water stream characterized by the presence of two or more of the following:

(I) multi-valent metal cations,

(II) alkalinity,

(III) at least one molecular species which is at low ionization levels when in solution at around neutral pH, to produce a low solute containing distillate stream and a high solute/solids containing blowdown stream, said apparatus comprising:

a) pretreatment equipment for effectively eliminating the tendency of said feed water to form scale on heat transfer surfaces when said feed water is concentrated to a desired concentration factor at a selected pH, comprising, in any order:

(I) at least one softener for removing a portion or substantially all multi-valent cations from said feed stream,and one or more of the following:

(II) at least one de-alkalizer for removing essentially all alkalinity from said feed water stream,

(III) a degasifier for removing dissolved gases,

(IV) chemical addition apparatus for raising the pH of said circulating solution in said heat transfer equipment to a selected pH of at least about 9 by adding a selected base thereto, to urge said at least one molecular species with low ionization levels when in solution at about neutral pH toward increased ionization;

(b) one or more evaporator units, said one or more evaporator units, treating said feed water to produce a high solute/solids containing blowdown stream and a low solute containing distillate stream, and to concentrate said feed water to said selected concentration factor.

104. (Withdrawn) The apparatus as set forth in claim 103, further comprising, downstream of one or more said evaporator units, to further process said low solute containing distillate stream therefrom, a cation exchange unit.

105. (Withdrawn) The apparatus as set forth in claim 103, further comprising, downstream of one or more said evaporator units, to further process said low solute containing distillate stream therefrom, an anion exchange unit.

106. (Withdrawn) The apparatus as set forth in claim 103, further comprising, downstream of one or more said evaporator units, to further process said low solute containing distillate stream therefrom, at least one mixed bed ion exchange unit.

107. (Withdrawn) The apparatus as set forth in claim 104 or claim 105 or claim 106, further comprising an ion exchange resin regenerator that generates an ion exchange regenerant stream, and further comprising means for directing said ion exchange regenerant stream to the inlet of said degasifier unit in order to treat said ion exchange regenerant stream in said evaporator.

108. (Withdrawn) The apparatus as set forth in claim 103, further comprising, downstream of one or more said evaporator units, to further process the said low solute containing distillate stream therefrom, a continuous electrodeionization unit to produce (a) a substantially solute free water stream and (b) a solute containing waste stream.

109. (Withdrawn) The apparatus as set forth in claim 108 further including means for directing said solute containing waste stream to the inlet of said degasifier for further processing.

110. (Withdrawn) The apparatus as set forth in claim 105, further comprising de-oiling apparatus upstream of said multi-valent cation removal softener.

111. (Withdrawn) The apparatus as set forth in claim 103, further comprising filtration equipment downstream of said softener.

112. (Withdrawn) The apparatus as set forth in claim 103, further including means for directing backwash water to the inlet of said softener for further processing.

113. (New) A process for treatment of a silica-containing aqueous feed stream using an evaporator, said process comprising:

(a) providing a feed water stream containing soluble and insoluble inorganic and organic species therein, said species comprising:

(I) multi-valent metal cations,

(II) alkalinity,

(III) at least one molecular species which is at low ionization levels when in solution at around neutral pH;

(b) removing a portion or substantially all multi-valent metal cations from said feed stream to a non-precipitating residual level, and

(c) processing the feed water stream by:

(I) removing substantially all non-hydroxide alkalinity from said feed water stream; and

(II) raising the pH thereof to at least 9 or higher;

(d) passing the product from step (c) into said evaporator, wherein said evaporator:

(I) contains a plurality of heat transfer surfaces,

(II) contains a circulating high solids solution, and

(III) wherein the pH of said circulating solution is maintained to at least 9, or higher; and

(e) condensing the vapor produced by the evaporator to produce a low solute containing distillate stream, the evaporator also producing a high solute solids containing blowdown stream.

114. (New) The process as set forth in claim 113, wherein the step of said multi-valent cation removal is accomplished in a weak acid cation ion exchange system operated in a hydrogen form.

115. (New) The process as set forth in claim 113, wherein the step of said multi-valent cation removal is accomplished in a weak acid cation ion exchange system that is operated in a sodium form.

116. (New) The process as set forth in claim 114, wherein said feed water stream contains more multi-valent cations than alkalinity, and further comprising, before feeding said feed water to said weak acid cation exchange system, the step of adjusting the ratio of multi-valent cations to alkalinity by adding a base to said feed water, so as to raise the alkalinity of said feed water.

117. (New) The process as set forth in claim 114, wherein said feed water stream contains more alkalinity than multi-valent cations, and further comprising, before feeding said feed water to said weak acid cation exchange system, the step of addition of acid to said feed water, so as to remove the excess alkalinity in said feed water.

118. (New) The process as set forth in claim 113, wherein the step of multi-valent cation removal is accomplished by passing said feed water through a sodium form strong acid cation ion exchange system.

119. (New) The process as set forth in claim 113, wherein after removing substantially all non-hydroxide alkalinity from said feed water stream dissolved gas is removed from said feed water stream.

120. (New) The process as set forth in claim 113, wherein said evaporator is operated without limitation of the concentration of silica (SiO_2) present in said blowdown stream.

121. (New) The process according to claim 113, wherein said evaporator comprises falling thin film evaporation equipment operating as a single unit or in series or parallel, or comprises forced circulation evaporation equipment or natural circulation evaporation equipment which operates as a single unit or in parallel to generate said distillate stream and said high solids blowdown stream.

122. (New) The process as set forth in claim 121, wherein said evaporator is operated in one of a steam driven multiple effect mode, a mechanical vapor recompression mode, a thermal compression mode, or as a multiple stage flash evaporator.

123. (New) The process as set forth in claim 113, further comprising heating said acidified feed water stream to enhance gas removal in a degasifier prior to entering said evaporator.

124. (New) The process according to claim 113, wherein the step of raising the pH is accomplished by addition of a base in aqueous solution, said base selected from the group consisting of sodium hydroxide, sodium carbonate, potassium hydroxide, and potassium carbonate.

125. (New) The process according to claim 113, wherein the step of raising the pH is accomplished by addition of an aqueous organic base.

126. (New) The process according to claim 113, wherein said feed water stream comprises one of cooling tower blowdown, scrubber blowdown, water utilized in ash transport in a coal fired steam-electric power plant, ash pond water, ash-sluicing water, effluent from sewage treatment, effluent from a food processing treatment, boiler blowdown, a concentrated stream from membrane separation equipment, effluent from oil refining operations, or effluents from hydrocarbon recovery operations.

127. (New) The process as set forth in claim 113, wherein the step of multi-valent cation removal is partially accomplished by passing said feed water stream through membrane softening equipment, or by increasing the pH to at least 10 in said feed water stream and passing the pH adjusted stream through membrane separation equipment to filter out hardness precipitate.

128. (New) The process as set forth in claim 113, further comprising, during the step of removing alkalinity, the additional step of removing substantially all non-hydroxide alkalinity not associated with hardness.

129. (New) The process as set forth in claim 113, wherein the steps of removing multi-valent cations, and removing alkalinity and increasing pH are accomplished prior to a membrane process to pre-concentrate the feed stream upstream of said evaporator described under step (d).

130. (New) The process as set forth in claim 113, wherein said low ionized species when in neutral or near neutral pH aqueous feed stream comprises silica (SiO_2).

131. (New) The process as set forth in claim 113, wherein said low ionized species when in neutral or near neutral pH aqueous feed stream comprises meta/ortho silicic acid (H_4SiO_4).

132. (New) The process as set forth in claim 113, wherein after step (c) (II) and prior to step (d), the process further comprises the step of removing dissolved gas in a degasifier.